pressures—fear of poison gas—persuaded Governments to devote huge sums to applied research, repayment to the basic physics of its origin has never been suspended.

This we appreciate, for example, when we consider the present-day understanding of just how much is involved in the solution of Clerk Maxwell's equations, of the subtleties of viscous flow hydrodynamics, of the complexities of non-uniform molecular kinetics, of evaporation, condensation and diffusion, of gas ions and electric charging, of turbulent fluid flow and of the physics of the atmosphere and beyond.

In applied science, aerosol techniques have grown alongside the theory of infectious diseases and are essential to it; the noun itself was coined during work on dust explosions and the greater industrial hazard, pneumoconiosis, is only coming to be understood and controlled by utilization of sound aerosol physics. The anatomy and physiology of respiration owe something, and will owe more, to the impetus of investigations of particle inhalation and to the appropriation of their techniques. Plant pathology, atmospheric contamination, the safe use of radioactive substances, therapeutic methods, filter design —a fascinating and almost incredible galaxy of interest sweeps into the mind when it considers the ramifications of the small particle.

It is therefore not surprising that the authors of the second edition of *Particulate Clouds* should comment ruefully on the vast and scattered literature of particulates and admonish those who publish the same facts more than once. They are on less sure ground in asking directors of research to prevent their young charges from straying into blind alleys. Shall the director of an applied research establishment evaluate more clearly a blind alley of science than his youngest Ph.D., or will he see the green leaf unspectacularly grey?

This new edition, appearing seven years after the first, has grown a little in text and greatly in references, which now exceed 1,300. Some 70 per cent of the book deals with the physics and mechanics of aerosols, while the remainder is divided into five chapters, covering industrial and environmental aspects. The approach in each section is selective, rather than historical, although most of the classical work is referred to.

With so wide a field it is scarcely reasonable to look for systematic development of the large number of theories mentioned. Many descriptive equations are quoted, but there is not much guidance on their range or validity, or about the different analytical approaches which are commonly made to complex practical problems. This is seen, for example, in the chapter on diffusion in the atmosphere. The ideas of eddy diffusion of gases are detailed, and practical formulae are quoted, but when it comes to particles, which settle at an appreciable speed, three quite distinct methods of attack have been tried which are not explained. These comprise, first, the assumption that the airborne concentration is unaffected by settlement, second, that settlement occurs throughout the height of the cloud so that the vertical distribution of concentration is a result of a balance between eddy diffusion and sedimentation and third, that the cloud settles as a whole at the velocity of the particles.

The theory of fibrous air filters is covered in more detail, and interesting comparisons are made of the various theoretical predictions. A section on real filters is contained in the second part of the volume, but there is no attempt to derive guidance in the design of filters from the theoretical leads which have had an undoubted influence. Membrane filters, which have been of the utmost value in aerosol sampling, are dealt with only in this connexion and their mode of action is not investigated.

This volume will be indispensable to applied scientists in a host of different fields. Aerosol specialists will keep a copy on their shelves and find themselves referring to it more often than they might have anticipated.

C. N. Davies

PHYSICO-CHEMICAL ASPECTS OF RIBOSOMES

The Physical and Chemical Properties of Ribosomes

By Prof. Mary L. Petermann. Pp. xii + 258. (Amsterdam, London and New York: Elsevier Publishing Company, 1964.) 55*s*.

THE need for a comprehensive review of the physico-chemical aspects of ribosomes is clearly demonstrated by a brief perusal of the list of references cited in *The Physical and Chemical Properties of Ribosomes*. A mere twenty-six of the 796 references were published before 1950 and the almost inevitable addendum lists a further two hundred references accumulating during the period October 1963–May 1964.

Prof. Petermann has been a significant contributor to this ever-increasing body of information and has now made the first attempt to contain the subject within the confines of a small book. For these reasons, and for the emphasis throughout on the experimental approaches to the subject, the book is likely to find a welcome in many laboratories. The comprehensive list of references will undoubtedly aid investigators requiring an introduction to the literature on ribosomes from plant, animal or microbiological sources.

The text is liberally sprinkled with ribosome species and readers who are unfamiliar with the vagaries of ribosomes may be confused by 50 *S* particles which apparently sediment at 35 and 55 *S* (for example, Table 1, p. 12). Prof. Petermann has an intractable problem here, for many of the ribosomes reported are frequently only identified by uncorrected sedimentation coefficients obtained under unspecified conditions; valid comparisons are therefore impossible. The problem is further complicated by the multitude of ribosome association, dissociation and degradation products, the ribosome precursors and the ribosomes found in drug inhibited and diseased states. It is therefore somewhat surprising to find categorical statements that "most bacterial ribosomes are of the 70 *S* type" and "in yeast, higher plants and animal cytoplasm the ribosomes are of the 80 *S* type". In a further simplification to avoid these difficulties Prof. Petermann has grouped together many of the sedimentation coefficients on the basis of their probable values at infinite dilution. The hazard in this procedure is that, for example, a physico-chemical identity may be assumed for all the ribonucleoproteins sedimenting in the range 35–55 *S*, and the only reasonably well characterized member of this group, the 50 $S^0_{w,20}$ ribosome from *Escherichia coli*. While such an identity is possible, the evidence for it is scanty, and a number of observations indicate that such a group is physically, chemically and biologically heterogeneous.

The chapters devoted to magnesium binding and the binding of small molecules by ribosomes are timely and clearly reflect Prof. Petermann's strong and critical interest in this aspect of ribosomes. These studies should contribute greatly to our ultimate understanding of the magnesium dependent binding of messenger and transfer RNA to ribosomes.

J. Sykes

ASPECTS OF PLANT PATHOLOGY

Annual Review of Phytopathology

Vol. 2. Edited by James G. Horsfall in association with Kenneth F. Baker. Pp. vii + 423. (Palo Alto, Calif.: Annual Reviews, Inc., 1964.) 8·50 dollars.

HAVING successfully launched the first of these new *Annual Reviews of Phytopathology* the editorial committee, with an eye on the future, has divided plant